Specification

This application is a national phase of PCT/JP2004/009128 that claims priority from Japanese patent application No. 2003-201079 filed July 24, 2003 and Japanese patent application no. 2003-338446 filed September 9, 2003.

Illumination optical equipment, exposure equipment and exposure method

Technical field

[0001] The present invention relates to illumination optical equipment, exposure equipment and an exposure method, and in particular relates to exposure equipment for manufacturing microdevices such as semiconductor elements, image pickup elements, liquid crystal display elements or thin film magnetic heads in a lithographic step.

Background art

[0002] In typical exposure equipment of this type, the optical flux that is emitted from the light source forms a secondary light source constituting a substantially planar light source comprising a large number of light sources, that are integrated by means of an optical integrator constituted by a fly-eye lens. The optical flux from this secondary light source is restricted by means of an aperture stop that is arranged in the vicinity of the downstream side focal plane of the fly-eye lens, before being input to a condenser lens.

[0003] The optical flux that is focussed by this condenser lens illuminates in superimposed fashion a mask that is formed with a prescribed pattern. After passing through the pattern of the mask, the light is imaged on a wafer, by means of a projection optical system. In this

way, the mask pattern is exposed by projection (i.e. transferred) onto the wafer. It should be noted that the pattern that is formed on the mask has a high density of integration and so it is indispensable to obtain a uniform illumination distribution on the wafer in order to accurately transfer this fine pattern onto the wafer.